



A Land Climate Data Record

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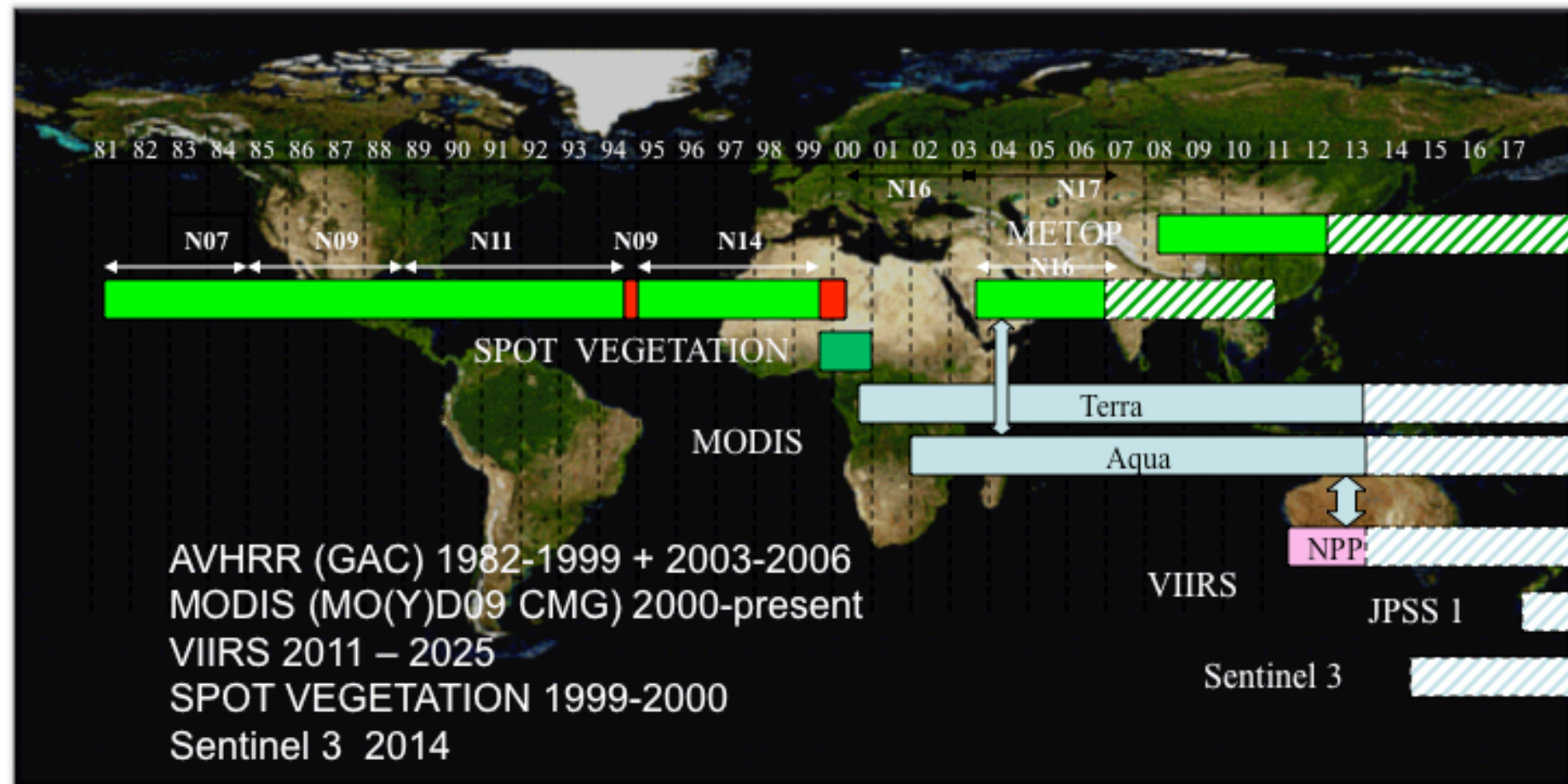


Figure 1: The generation of a Land climate data record (several decade) necessitates the use of multi instrument/multi sensor science quality data record. This record is used to quantify the trend and change in land surface parameter (e.g. Vegetation/Land Cover). A strong emphasis is put on data consistency which is achieved by careful characterization and processing of the original data rather than degrading and smoothing the dataset.



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Abstract:

A 30+ years of daily surface reflectance and vegetation index data processed in a consistent way is now available from the LTDR project (Land Long Term Data Record). It is generated from data of several AVHRR instruments from 1981 to 1999 and of the MODIS instruments on-board Terra and Aqua from 2000 to 2012. It uses state of the art algorithms for geo-location, calibration, cloud screening, atmospheric and surface directional effect correction to achieve the most consistent data record possible. This dataset is a daily global dataset at the resolution of 0.05 degree of latitude and longitude. This dataset has also been tested prior to release in practical applications of societal benefits such as forest cover change detection over the long term as well as drought monitoring or yield prediction in the context of agricultural production and food security (see 2010 references).

References:

Inbal Becker-Reshef, Chris Justice, Mark Sullivan, [Eric Vermote](#), Compton Tucker, Assaf Anyamba, Jen Small, Ed Pak, Ed Masuoka, Jeff Schmaltz, Matthew Hansen, 3, Kyle Pittman, Charon Birkett, Derrick Williams, Curt Reynolds and Bradley Doorn , 2010, Monitoring Global Croplands with Coarse Resolution Earth Observations: The Global Agriculture Monitoring (GLAM) Project **Remote Sensing**, 2(6), 1589-1609;doi:10.3390/rs2061589 .

Becker-Reshef, I., [E. Vermote](#), M. Lindeman and C. Justice, 2010. A Generalized Regression-based Model for Forecasting Winter Wheat Yields in Kansas and Ukraine Using MODIS Data, **Remote Sensing of Environment**, doi:10.1016/j.rse.2010.01.010.,114:1312-1323.

Data Sources: The data were produced by the MODIS Adaptive Processing System and the LTDR system (Code 619) and are available with documentation from <http://ltdr.nascom.nasa.gov/>

Technical Description of Figures:

Figure 1: Sources of polar orbiting satellite-data for the land long-term data record. The gap between AVHRR GAC data and Terra MODIS data will be filled using a SPOT VEGETATION product. VIIRS instruments could further extend the data record beyond 2017.

Scientific significance:

The approaches developed are the basis for producing climate data record for terrestrial studies starting with well calibrated and corrected data for surface directional and atmospheric effect and rigorous cloud screening. From that dataset, several Essential Climate Variables (ECVs) in addition to vegetation index can be produced and are under development such as LAI/FPAR (Leaf Area Index and Fraction of Absorbed Photosynthetically Active radiation).

Relevance for future science and relationship to Decadal Survey:

This is extremely relevant to future science that necessitate the use of different data set in combination (e.g. Climate Data Record). In particular, the methods used are general enough that they can be applied to future sensors.